

17, 1932, is administered by the National Park Service, U.S. Department of the Interior. A superintendent, whose address is Box 60, Alamosa, CO 81101, is in immediate charge of the monument.

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interests of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

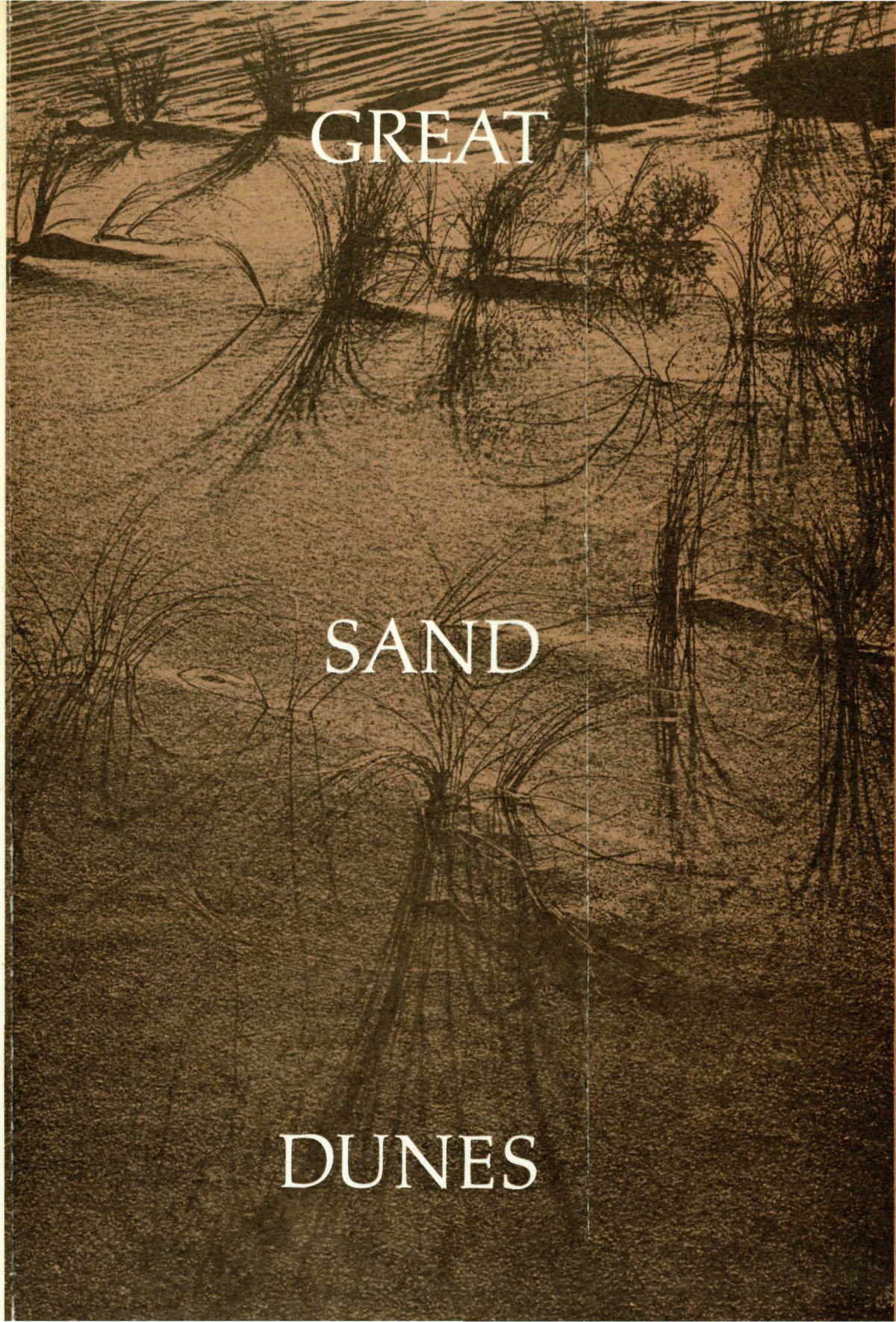
We're Joining The Metric World—The National Park Service is introducing metric measurements in its publications to help Americans become acquainted with the metric system and to make interpretation more meaningful for park visitors from other nations.

Great Sand Dunes National Monument, established on March

GREAT

SAND

DUNES



GREAT SAND DUNES NATIONAL MONUMENT, COLORADO

The San Luis Valley is a desert: it receives less than 23 centimeters (8 inches) of moisture a year. Three times the size of the State of Delaware, and with a floor more than 2,300 meters (7,500 feet) above sea level, it was shaped millions of years ago by great movements in the Earth's crust.

To the east and northeast of the valley is the abrupt wall of the Sangre de Cristo Mountains; to the west lie the volcanic San Juan Mountains; and to the south, the San Luis Hills. At the eastern edge of this broad valley are some of the world's tallest inland sand dunes, piled to heights up to 210 meters (700 feet).

Why did the dunes form? Generally, three conditions are necessary for the formation of sand dunes wherever they may be: sand, wind, and a natural trap. Here these conditions exist. Fed by melting snow, streams have carried sand, silt, and gravel into this mountain-ringed basin for thousands of years. Most of these streams, particularly those flowing from the Sangre de Cristos, drop their loads and sink into the valley floor a short distance from the mountains. However, studies of the minerals of the sand reveal a large amount of volcanic material, indicating that much of the sand came from the San Juan Mountains across the valley, carried to the valley floor by the Rio Grande and its tributaries.

The desert floor of the San Luis Valley is covered only sparsely with vegetation that does little to hold the light sandy soil. Therefore, once in the valley, the sand and silt are exposed to the prevailing southwesterly winds, which for countless centuries have blown and bounced dust and sand grains toward the Sangre de Cristos. Here, on reaching the lofty mountain barrier, the winds sweep upward and funnel through Mosca, Medano, and Music Passes—low gaps in the range. The dust may continue, but sand is too heavy to be carried on. Thus it is piled at the foot of the mountain passes, caught in the curvature of the range—a natural trap.

The ceaseless winds change and shape the dunes, particularly when storms sweep down from the northeast. These shift the ridgetops of the dunes until they seem at times to lean backwards. After the storms have passed, the southwest winds again take over, restoring the ridge contours to their former shapes. Day-to-day changes can be seen in the lacelike patterns of ripples that stretch across every ridge and trough, but the dunes themselves change very little through the years. Photographs taken in 1927 show that the main dune mass appeared then very much as it does today.

Medano Creek forms the eastern boundary of the dune mass for several kilometers before it disappears into the sand. East of the creek is an area of small dunes, formed from sand that blows across the streambed when it is dry.

The dunes and Medano Creek, at the meeting place of valley floor and mountain range, provide a variety of living conditions. In addition to plant and animal communities normally found on the valley floor, foothill slopes, and forested highlands, there is the peculiar and distinctive, though sparse, vegetation of the dunes themselves. Lack of moisture and the continually moving surface of the sand prevent plants from obtaining a foothold, except in protected depressions where small patches of grass, a species of low pea plant, and sunflowers find suitable conditions and stabilize the sands.

Rabbits, ground squirrels, coyotes, magpies, and other small mammals and birds abound along the southwest edge of the dune area—characteristic of the rabbitbrush and grassland of the valley floor. Chipmunks, mule deer, jays of several species, and other creatures that are typical of the pinyon-juniper-ponderosa pine belt of the foothill region are at home in the eastern and northern parts of the monument. Observers have counted more than 150 species of birds in the vicinity.

Archeological research in the San Luis Valley, although limited, indicates that this region was occupied about 10,000 years ago by nomadic hunters. Two of their campsites, which have been excavated, yielded spear points—called Folsom points—in association with bones of what appears to be an extinct species of bison. From about 10,000 years ago to the historic period, various other groups of Indians came here.

During much of relatively recent times, Ute Indians largely controlled the valley. Certain Puebloan groups, the Apache from the south, and the Comanche, Cheyenne, and Arapaho from the east and north periodically visited here. Only the Ute Indians made the valley their permanent home.

Spanish explorers, moving northward from New Mexico along the Rio Grande, are known to have reached the San Luis Valley. Juan Bautista de Anza, in 1779, traversed the west side of the valley on the outgoing leg of his expedition against the Comanches and returned to Santa Fe via one of the mountain passes south of the dunes.

In the winter of 1806-7, Lt. Zebulon Pike, exploring the territory acquired through the Louisiana Purchase, entered the San Luis Valley by way of Medano Pass and raised the United States flag at a temporary fort on the Conejos River. Pike included in his journal a description of the dune area. Later, other explorers, including John W. Gunnison (1853), viewed the dunes. Permanent settlement in the San Luis Valley began early in the 1850's.

The Visitor Center contains exhibits about the natural history, prehistory, and history of the area.

Accommodations within the monument are limited to a year-round campground and picnic area that has water, tables, and fire grates. Groceries, snacks, gifts, gasoline, and a campground are available during the summer season just south of the monument.

Hiking on the dunes is most pleasant early and late in the day. At midday in summer the sand can be uncomfortably hot. Most visitors begin their walks at the picnic area, choosing their routes because there are no trails on the dunes. A walk to the top and return takes about 3 hours. *A word of warning*—wear shoes! The

sand is very abrasive and can reach temperatures above 60°C (140°F), hot enough to blister bare feet.

Naturalist activities are held during the summer season. Walks are conducted to the dunes, and each evening park naturalists give campfire programs on the natural and human history of the area. The visitor center has a full schedule of activities. *The self-guiding Montville Nature Trail* is 0.8 kilometer (0.5 mile) long. Leaflets are provided at the trailhead north of the visitor center.

Back-country vehicle tours operated by the concessioner are scheduled several times daily or upon demand. For further information write to the Great Sand Dunes Company, P.O. Box 1165, Alamosa, CO 81101.

All motor vehicles, including trail bikes, and their

operators must be properly licensed. Use of the Medano Creek Jeep Trail is restricted to four-wheel drive vehicles and trail bikes. Off-road travel or driving on the dunes is prohibited.

Be careful with fire! Build campfires only in constructed fireplaces.

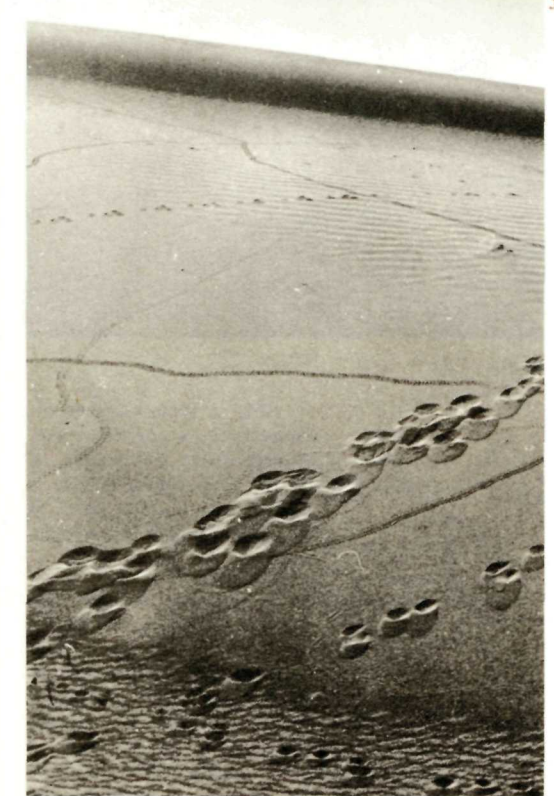
All plants, animals, rocks, minerals, and historical and archeological objects must be left undisturbed and unharmed. Feeding animals and birds is prohibited; it is unhealthy for the wildlife and dangerous to you.

Pets must be kept under physical control at all times. *Hunting or shooting* in the monument is prohibited.

Keep the premises clean by placing your trash in refuse containers.

Parents should watch children closely because it is easy to get lost in the dunes.

1—A forest buried by the sand is revealed as the dunes move on. 2—Medano Creek cuts at the face of the oncoming dunes. 3—Winter, as drifts of sand are covered with snow.



4—The dunes and the mountain barrier. 5—Early morning records in the sand of a night's activity. 6—A natural trap where the wind funnels through low passes. 7—The massive dunes are delicately sculptured by the wind.



Figure 3 by Eliot Porter; figure 6 from *Geology Illustrated* by John S. Shelton, W. H. Freeman and Co., 1966.